ABSTRACT

A CMOS inverter having a heterostructure including a Si substrate, a relaxed $Si_{1-x}Ge_x$ layer on the Si substrate, and a strained surface layer on said relaxed $Si_{1-x}Ge_x$ layer; and a pMOSFET and an nMOSFET, wherein the channel of said pMOSFET and the channel of the nMOSFET are formed in the strained surface layer. Another embodiment provides an integrated circuit having a heterostructure including a Si substrate, a relaxed $Si_{1-x}Ge_x$ layer on the Si substrate, and a strained layer on the relaxed $Si_{1-x}Ge_x$ layer; and a p transistor and an n transistor formed in the heterostructure, wherein the strained layer comprises the channel of the n transistor and the p transistor, and the n transistor and the p transistor are interconnected in a CMOS circuit.